The oat crop over the more southern portions also matured sufficiently early to escape serious injury, but over the more northern and eastern sections of the affected area the loss to this crop was heavy, the reduction from the crop of the preceding year amounting to probably 300,000,000 bushels in the States of the lower Missouri, middle Mississippi, and lower Ohio Valleys.

The drought occurred at the most critical period in the growth and development of the corn plant in the middle and southern portions of the great corn belt, and hence the losses to that crop were exceedingly heavy. In Kansas the crop was practically a failure, the production being estimated at about 24,000,000 bushels, compared with 174,000,000 bushels produced in 1912, a loss of about 150,000,000 bushels in that State alone. In Missouri the loss from that of the preceding year was estimated at about 121,000,000 bushels, in Iowa about 109,000,000 bushels, in Nebraska about 80,000,000 bushels, and in Oklahoma about 37,000,000 bushels. Adjoining States were not so severely affected, but the total reduction of the corn crop this year as compared with 1912 is estimated at about 750,000,000 bushels, the greater portion of which was sustained by the States of the Middle West.

Potatoes suffered severely also, the late crop proving a complete failure in many sections, while the total crop for the country is estimated to have fallen off more than 100,000,000 bushels as compared with the crop of 1912.

In the Western States of the cotton belt the condition of cotton in Texas fell from an average of 81 on July 25 to 63 by September 25; Oklahoma in the same time fell from 81 to 42, Missouri from 80 to 64, and Arkansas from 87 to 63.

All vegetables and fruits suffered severely, and gardens were largely total failures. Hay and pasturage were greatly reduced, and the feeding of stock became necessary in many sections early in August, and by September 1 it was general over much of the region. On account of the scarcity of feed of all kinds, the shortage of the water supply, and the impossibility of carrying stock through the coming winter except at heavy cost, much of it was forced upon the market in unfit condition and under circumstances that entailed great loss to the owners and at the same time greatly reduced the opportunities for promptly restocking.

EFFECT ON HEALTH CONDITIONS.

Despite the long-continued periods of excessive heat and lack of appreciable rainfall, the general health of the communities was sustained in a remarkable manner. Few deaths occurred that were directly attributable to the adverse weather, and the number of sunstrokes was scarcely greater than usual.

Extracts from reports of Weather Bureau officials at points in the districts affected, together with charts showing some of the more important phases of the unusual weather conditions, are appended.

THE DROUGHT OF 1913 IN KANSAS.

By S. D. FLORA, Observer, Topeka, Kans.

The drought of the summer of 1913 was one of the most damaging that Kansas has experienced since authentic weather records were begun in the State. The three summer months—June, July, and August—were drier than the summer months of any other year since State-wide weather records were begun in 1887, and came within a fraction of a degree of averaging warmer than the same months of 1901, which is the warmest summer on record in the State. At some places in the south-central part of the State the average for these months was higher than for the corresponding months of 1901. If, however, the comparison be continued to September 10, the date when the heat wave was broken, the average temperature for the whole period June 1 to September 10, 1913, was the highest of record for the State.

Prior to 1887 reliable records of precipitation were kept at comparatively few places in the State, but a study of those available indicates that even the famous drought years of 1860 and 1864 were favored with a greater summer rainfall than 1913, and that, with the possible exception of the summer of 1874, the summer of 1913 stands alone as the driest the State has experienced since the early fifties, when there were only a few settlements in the State.

The following table gives a comparison of the mean temperatures and total precipitation over Kansas during June, July, and August, 1913, with those of the corresponding months of 1901 and 1911, the two previous driest and warmest summers since a complete record of weather over the State was begun in 1887:

Year.	Mean temperature.	Total precipitation.
1901	80.5	6.85
1911	78.5	8.38
1913	80.2	4.24

Normal temperature for the State as a whole for June, July, and August, 76.2°; normal precipitation for the same period, 11.32 inches.

Though the year 1913 is the fourth successive one of deficient precipitation in Kansas, weather conditions the first five months were favorable in all parts of the State except the south central and south western portions and a few counties in the extreme west central part, where there was considerable need of more moisture. Between the middle of June and the 10th of September there were no rains of consequence anywhere in the State except in some southeastern counties and a few scattered stations in the lower Kansas River Valley and in the northwestern portion. For the entire three months, June, July, and August, the average precipitation over the eastern division of the State was 4.42 inches, a deficiency of 8.67 inches; for the middle division, 3.81 inches, a deficiency of 7.06 inches; and for the western division of the State, 4.51 inches, a deficiency of 4.64 inches.

There was no part of the State where the drought was not felt greatly, but it was most severe in the central portion, and the ill effects of it were least felt in the east central portion, the lower Kansas River Valley, and some northwestern counties.

In the most severe droughts of recent years, 1901 and 1911, soaking rains fell the latter part of July and the first of August, but this year the rains were delayed until September 10—too late to benefit even late corn or vegetables and almost too late to start fall pastures or produce another cutting of alfalfa except in a few favored localities.

EFFECT ON THE CORN CROP.

The damage to the corn crop was considerably greater than the damage by the drought of any previous year.

The present prospect is for about 10 per cent of a full crop, which would indicate about 15,000,000 bushels. In 1911 the State harvested, in round numbers, 60,000,000 bushels; in 1901, 43,000,000 bushels; and even in 1874, when the crop was the least of any year since 1868, there were 16,000,000 bushels, as shown by the reports of the Kansas State Board of Agriculture. In about half the counties of the State the crop is reported a complete failure. Practically the only fields that will produce enough corn to be worth husking are those in the lowlands. An unusual amount of corn was cut and stored in silos, which will help materially toward relieving the shortage of stock feed this winter.

THE HAY CROP.

The damage to wild or prairie hay varies from about 50 per cent in the eastern counties to a total failure in the southwestern, though a few favored counties report the usual crop. Alfalfa seems to have stood the drought better, and in the eastern half of the State from two to three cuttings were generally obtained. The usual number in that part varies from four to five cuttings. In the western half there were one or two cuttings, the first being generally extra heavy and of good quality, and a fine seed crop later in the summer has compensated in a large measure for the deficiency in hay.

DAMAGE TO VEGETABLES.

The vegetable crop, with the exception of early potatoes and a few other early vegetables, was practically a failure except in the few places where it was irrigated. Early potatoes made about half a crop.

THE WHEAT CROP.

Over the eastern half of the State the drought began too late to damage wheat. In the western, and especially the southwestern portion, wheat was badly damaged. In some counties there was less than 50 per cent of a crop, and a few counties along the Colorado line raised no wheat at all.

PROSPECT FOR STOCK FEED NEXT WINTER.

In nearly every county of the State it is reported that stock feed was never before so scarce at this time of the year. In the northwestern part of the State, however, feed is more plentiful than in either 1901 or 1911. There has been an unprecedented movement of cattle to the eastern markets, which will result in a marked scarcity of beef cattle for the next year or two. About three-fourths of the counties report that, with the number of cattle already shipped out and the increased use of corn for ensilage, they will have enough feed to carry their stock through the winter, though in many instances it will be necessary to use forage that is not desirable.

EFFECT ON WATER SUPPLY.

It is generally reported that the drought caused stock water to be scarcer than it ever was before, except in the western counties and those along the Arkansas River east to Sedwick County, where there is an inexhaustible supply of underground water—the "underflow," as it is commonly called. Creeks and small lakes are dried up that were never before known to be dry. Only a few reports state that the water supply was lower in 1860 or 1901. In some of the larger cities, notable among which is Topeka, ample provision had been made for a supply of water that was sufficient for all purposes, but individual farmers and smaller towns in the eastern half of the State experienced much difficulty in obtaining sufficient water. In several instances it was necessary to ship the water supply for whole towns in tank cars, and to make this possible the State utilities commission put into effect emergency rates on water. The Rock Island Railroad was compelled to haul 18 tank cars—180,000 gallons—of water daily from the Kansas River at Topeka to supply its shops at Horton, a distance of 45 miles. It also found it necessary to haul water in tank cars for steam purposes at Pawnee, Sabetha, Prairie View, Herington, and Caldwell, though these hauls were shorter than the one from Topeka to Horton.

EFFECT OF THE DROUGHT ON PEOPLE GENERALLY.

The health of the people in the State was so much better than would have been expected from such extreme weather conditions as to cause considerable comment. Only 17 deaths from the direct effects of the heat were reported to the State board of health during June and July, as against eight in the corresponding months last year; and the report for August, while not yet complete, will not show much more of an excess over the corresponding number for August last year. The prolonged period of hot days and uncomfortably warm nights was debilitating, but not in the degree that might have been expected from the temperatures that occurred. There was considerably more than the usual summer travel to cooler climates, and the railroads report the heaviest summer passenger business they ever had. The work that was to be performed during the summer went on with almost the usual energy, though there was a general feeling of depression, due mostly to the knowledge that the continued drought was ruining the crops, upon which the prosperity of the State depends almost entirely.

THE DROUGHT OF 1913 AT CONCORDIA, KANS.

By J. W. BYRAM, Observer.

The summer of 1913 was remarkable on account of the intense thermal conditions and extraordinary drought which overspread this section. This drought was a continuation of the general deficiency in precipitation which began in January, 1910.

Thunderstorms on June 4, 5, and 6, 1913, were attended by 2.01 inches of rain. From June 7 to 30, inclusive, no rain, other than local showers on the 19th, 21st, and 30th, occurred.

On May 31 the precipitation for the year 1913 to that date was 0.35 of an inch in excess of the normal, and the rain of June 4, 5, and 6—2.01 inches—increased the departure to +1.40 inches. The rains of June 19, 21, and 30 amounted to 0.75 of an inch, a deficiency of 3.26 inches during the 24-day period June 7 to 30, inclusive. So, for purposes of this report, the drought of 1913 will be considered as having its inception June 7 and ending September 8, when rains and cooler weather materially changed the outlook and modified to some extent the effects of the most disastrous period of heat and drought in the history of north-central Kansas.